(1934-1940): Flora of Assam. Calcutta.

KINGDON-WARD, F. (1960): Pilgrimage for Plants, London.

MATTHEW, K. M. (1966): A preliminary list of plants from Kurseong. *Bull. bot. Surv. India. 8*: 158-168.

PRAIN, D. (1903): Bengal Plants, II, Calcutta.

43. NEW LOCALITIES FOR LEPTOSPORANGIATE FERNS IN RAJASTHAN, INDIA

Leptosporangiate ferns in Rajasthan have mostly been reported from Mt. Abu, the highest peak of Aravalli ranges in the state (Sutaria 1941, Mahabale & Kharadi 1946, Raizada 1954, Bir & Verma 1961, Kanodia & Deshpande 1962 and Mital 1969). The few exceptions are reports of *Dryopteris parasitica* (L.) O. Ktze. from Naldeshwar, in Alwar district (Vyas 1964) and *Pityrogramma calomelanos* Link., *Pteris cretica* L. and D. *parasitica* from Parshuram hills in Udaipur district (Vyas 1965). Moreover the xerophytic ferns *Actiniopteris radiata* (Swartz) Link. and *Adiantum caudatum* L. and the water ferns *Marsilea* and *Azolla* occur widely all over the state (Mital 1969). A recent survey of the state, especially the southeactern region has revealed many new localities for leptosporangiate ferns. In most cases these newer localities are depressions in the plateaux regions adjoining Aravalli and Vindhya ranges providing appropriate humidity (especially during rainy season) and secluded habitats for natural occurrence of these ferns. A brief description of these new localities along with the older ones (Mt. Abu, Parshuram hills and Naldeshwar) and the ferns recorded from these forms the subject matter of this communication.

MOUNT ABU—A hill station, being the highest point between Himalayas and Nilgiris, in Sirohi district of south east Rajasthan, it is the best known fern locality of the state. In a survey carried out in the month of October 1975 & 1976 the following fern taxa were recorded.

1. *Cheilanthes albomarginata* Clarke
2. *C. farinosa* (Forsk.) Klf.
3. *Nephrolepis cordifolia* (L.) Pr.
4. *Tectaria macrodonta* (Fee) C. Chr.
5. *Athyrium falcatum* Bedd.
6. *A. schimperi* Moug. ex Fee
7. *A. parasnathense* (Clarke) Ching
8. *A. puncticaule* (Bl.) Moore
9. *A. pectinatum* (Wall.) Pr.
10. *A. hohenackerianum* (Kze.) Moore
11. *Hypodematium crenatum* (Forsk.) Kuhn
12. *Asplenium pumilum* var. *hymnophylloides* (Fee) Clarke

We could not find the following ferns reported earlier from Mt. Abu inspite of a thorough search of this area.

Cheilanthes belangeri (Bory) C. Chr. reported by Kanodia & Deshpande 1962; *Pteris vittata* Linn. reported by Bir & Verma 1961; *Dryopteris cochleata* (Don) C. Chr. reported by Mital 1969; *Cyclosorus dentatus* (Forsk.) Ching reported by Bir & Verma 1961 and Mital 1969;a *Asplenium lunulatum* Sw. reported by Kanodia & Deshpande 1962.

PARSHURAM HILLS—This locality consists of hilly area covered by thick forest around Fort Kumbhalgrah in Udaipur district of Rajasthan and forms a continuation of the Aravalli ranges from Mt. Abu. Following fern taxa were recorded during a survey in October 1975.

1. *Cheilanthes albomarginata*
2. *C. farinosa*
3. *Hypodematium crenatum*

We could not locate any plants of *Pityrogramma calomelanos, Pteris cretica* and *Dryopteris parasitica* reported by Vyas (1965) from this locality.

NALDESHWAR—It is situated in Alwar district and although thickly forested not many pteridophytes occur in this region. We could record only *Cyclosorus dentatus* from this locality apart from the ubiquitous *Actiniopteris radiata* and *Adiantum caudatum*. Vyas (1964) reported *Dryopteris parasitica* from here but we did not find a single plant of this fern during our survey in August 1975 & 1976.

MAINAL—This locality forms a natural depression in flat plateaux about 45 km from Bhilwara town in Rajasthan. We recorded the following ferns in a survey of this locality in September 1975.

1. *Pteris vittata* Linn.
2. *Hypodematium crenatum* (Forsk.) Kuhn

This is a new locality for both these ferns in Rajasthan.

JOGANIYAMATA TEMPLE—This again is a natural depression about 5 km from Mainal and the two ferns found here are again *Pteris vittata* and *Hypodematium crenatum*.

RAMESHWAR—This locality is situated about 7 km from the town of Bundi in south east Rajasthan and forms a natural depression. The following fern taxa were found growing at this locality in August 1975 and are being recorded for the first time from this place.

1. *Hypodematium crenatum*
2. *Cyclosorus dentatus*

BHIMLAT—A natural depression about 28 km from Bundi this locality was found to possess pure formations of *Cyclosorus dentatus* when visited in September 1975 and 1976. A few plants of *Hypodematium crenatum* were also found here.

GWAPERNATH—About 11 km from Kota in south east Rajasthan this locality is one of the richest after Mt. Abu for leptosporangiate ferns from where Sharma & Bhardwaja (1976) recorded *Selaginella rependa* for the first time in Rajasthan. It also forms a natural depression. The ferns recorded from here, again for the first time are listed below. The survey was carried in October 1975.

1. *Cheilanthes albomarginata*
2. *C. farinosa*
3. *C. belangeri*
4. *Pteris vittata*
5. *Hypodematium crenatum*

SITABARI FOREST—This thick forest on rocky soil is about 50 km east of Kota. It is here that we found, for the first time the Thelypteroid fern, *Ampelopteris prolifera* (Retz.) Copel. covering the forest floor. It is a new record for the occurrence of this fern in Rajasthan. *Ceratopteris thalictroides* (L.) Brongn. reported earlier by Singh (1970) was also found growing along water channels in this forest.

JHALAWAR—Around this town in south east Rajasthan only *Ceratopteris thalictroides* was found growing in water channels near the forest nursery. This is a new record for the occurrence of this fern in this region.

BANSWARA—A district forming the extreme south of Rajasthan. It abounds in *Ceratopteris thalictroides*. This water fern was found growing in water channels of rice fields near the city and in a stream at Tripura-Sundari about 15 km north of Banswara. The survey was carried out in February 1975.

Thanks are due to University Grants Commission, New Delhi, for sanctioning an Ad-

vanceed Research Project on Pteriodophytes of Rajasthan. Principal N. M. Kothari of Government College, Ajmer provided facilities and encouragement for this work.

BOTANY DEPARTMENT,
GOVERNMENT COLLEGE,
AJMER, 305 001,
November 2, 1977.

T. N. BHARDWAJA
A. K. YADAV
C. B. GENA

REFERENCES

BIR, S. S. AND VERMA, S. C. (1961): Ferns of Mt. Abu. *Proc. Indian Sc. Congrs. Assoc. 3*: 48, 270.

KANODIA, K. C. AND DESHPANDE, V. R. (1962): Additions to the flora of Mt. Abu, Rajasthan. ibid. *3*: 49, 312-313.

MAHABALE, T. S. AND KHARADI, R. G. (1964): On some ecological features on the vegetation of Mt. Abu. *Nat. Acad. Sci. 16*: 53.

MITAL, P. L. (1969): Ferns and fern-allies of Rajasthan. *J. Bombay nat. Hist. Soc. 66*: 31-42.

RAIZADA, M. B. (1954): A botanical visit to Mt. Abu. *Indian Forester, 80*: 207-215.

SHARMA, O. P. AND BHARDWAJA, T. N. (1976): *Selaginella* in Rajasthan. *Fern Gaz. 11*: 263.

SINGH, V. (1970): Occurrence of *Ceratopteris thalictroides* (L.) Brongn. in Rajasthan. *J. Bombay nat. Hist. Soc. 67*: 354-355.

SUTARIA, R. N. (1941): Flora of Mt. Abu. *J. Bombay Univ. 9*: 64-68.

VYAS, L. N. (1964): Vegetation of Alwar and its relationship with the North-Eastern Rajasthan. *J. Indian Bot. Soc. 43*: 322-333.

———— (1965): Vegetation of Parshuram Hills and its neighbourhood. ibid. *44*: 149-162.

44. PINE FORESTS IN NEPAL

In the present paper, I have described the area and places where Pine forests are located in Nepal. It is based on Journeys undertaken by me and the information available from literature.

In Nepal two species of *Pinus* are found:

Pinus wallichiana A. B. Jacks—Indigenous, with east-west distribution. Grows between altitude 2000 to 4000 m. In west Nepal, it is present in the extreme west between 2200 m to 3300 m altitude; in the valleys of Humula near Simikot at 2500 m; and on the side of Rara lake in Jumla at 3300 m. Grows in Bheri Zone. The highest altitude at which this species grows in Nepal is about 4800 m close to Kanjirobal Himal near Jumla. It is also present towards the north west of Pokhra. Grows as a dense forest on way to Kathmandu at Shivbhanjyang and Daman between altitude 2300 to 2650 m. In Kathmandu it is present at the lowest limit of 1500 m, it has been observed that *Pinus wallichiana* growing at Kathmandu bears a less developed membranous sheath on dwarf shoots or foliar spurs in comparison to those growing at higher altitudes where the plants develop scales on the spurs. Specimens collected are preserved in the Herbarium, M.S. College, Saharanpur. In the east it is present near Langtang valley and at Rolwaling near lontitude 86°E and in the eastern most part of Nepal particularly in areas like Namche, Lamche bazar, Topke and Walangchung between longitudes 86.8°E to 88°E.

Pinus roxburghii Sargent — Indigenous,